



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Milliken Industrials Limited
Serial No : 09/937,618 Examiner : C. Prall
Filed : September 16, 1999 Art Unit : 1771
For : NON-WOVEN FABRIC

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PME

DECLARATION

I, Alan John Brasier, a British citizen of 53 Swallowcroft, Eastington, Stonehouse, Gloucestershire, GL10 3BH, United Kingdom, do hereby declare as follows:

1. I am the named inventor of the above referred Patent Application (the Application) and I have been employed by Milliken Industrials Limited (the Applicant) for 11 years. I am development manager and I have worked in the development of new textiles as sport coverings for 25 years.
2. During October 1997, that is prior to the filing of the corresponding British Application from which the Application claims priority, I conducted a series of confidential tests to compare the playing qualities and performances of tennis balls covered with multi-angled needle felts as described in the Application with tennis balls which were currently available in the trade and provided with conventional felts, either woven or needlefelted.
3. The tests were carried out by four professional tennis players (tennis coaches) playing on two hard courts surfaced with porous macadam by a company called En-tout-cas. Each pair of players were provided with four tennis balls being:
 - two balls made according to the invention (called Prototype 1 and Prototype 2 hereinafter). These two balls comprised a standard rubber core and felt covering. The balls comprised a felt outer covering as described in the Application and in Claim 14 which reads:

"A felt-covered ball, characterised in that the ball-covering felt is a needlefelt comprising an entanglement of fibres formed by the needlefelting of a fibre

batt passed through a needlefelting machine having at least one needleboard providing barbed needles to penetrate said web in a range of angles including a plurality of angles which are non-perpendicular with respect to the surface of the batt".

Each of the two balls was manufactured with identical materials. The only difference between the Prototype 1 and the Prototype 2 balls was a slight variation in the settings of the needling with regard to the density and the penetration depth of the needles.

- one ball covered in standard needlefelt (hereinafter called the needlefelt ball) which was sold internationally as Milliken USA Lorette 504.
 - one ball covered in woven felt (hereinafter called the woven ball) sold under the Trade name Playne's 27 style – at that time Milliken's "economy" woven product.
4. The Milliken USA Lorette 504 and the Playne's 27 style balls had similar structures to the Prototype 1 and Prototype 2 balls and felts of similar composition. All the balls conformed to the International Tennis Federation Rules of Tennis (rule 3) and were as near as possible identical apart from the outer covering which differed as described above.
 5. The test was carried out over four hours playing time with questionnaires completed after 30 minutes, 90 minutes, 180 minutes and 240 minutes. Each ball style was identified to the players by a code letter only.
 6. On each questionnaire the players were asked to assess each ball for each performance characteristic on a scale of 1 to 5 to the nearest half point, the significance of which is as indicated on the graph. In each case three was considered "normal". These characteristics were: felt cover wear, felt cover fluff level, feel off racquet, weight off racquet, speed of flight, control of spin, rebound spin, rebound speed, rebound angle and overall performance. For each characteristic the four sets of answers were averaged and charted on the nine charts attached hereto. On these charts the woven felt (represented in green) was used as a benchmark and standard deviations for this ball were plotted.
 7. The important assessments from the point of view of the felt are:

- Chart I: Standard needlefelt always wears more rapidly than woven. Prototype 1 and Prototype 2 are very similar to the woven ball.
- Chart II: On hard courts standard needlefelt can disintegrate rapidly and "fluff up" where woven felt performs more consistently. Again the Prototype 1 and Prototype 2 came close to the woven sample.
- Charts III & IV: The feel and weight off racquet of Prototype 1 and Prototype 2 were more constant over time. In particular the felts of Prototype 1 & 2 did not cause the balls to "die" in the same way as the standard needlefelt ball.
- Charts V & VI: The speed of flight and control of spin characteristics are closely related to wear. If the ball wears smooth then it flies faster and has less "grip" on the racquet. Typically a needlefelt ball will wear smooth as shown in the charts.
- Charts VII & VIII: The rebound speed and rebound angle of a tennis ball reflects the way the felt influences the ball deformation on impact. Both Prototypes 1 and Prototype 2 did not significantly degrade over time. Prototype 1 is shown as assessed to be both good and constant.
- Chart IX : The overall results shown in Chart IX are of crucial importance as this denotes the player's impression of the ball and is the assessment used when buying balls. The overall impression of the balls covered with standard needlefelt and woven felt deteriorated over time. Both conventional balls were assessed as "good" at 30 minutes, then the standard needlefelt ball deteriorated steadily as the standard woven ball deteriorated after 180 minutes. Both Prototype 1 and Prototype 2 performed well -- and Prototype 1 was assessed as better than the woven ball at 240 minutes.

8. From these results I form my professional opinion that the tennis balls of the invention are of better quality as they are able to maintain good playing characteristics for a substantially longer period of time than conventional needlefelted balls. This is particularly advantageous as one of the major problems in tennis is the rapid deterioration in the quality of the needlefelt balls used, which in turn necessitates the use

of a considerable number of new balls within a match in order to maintain an acceptable minimum standard of ball quality.

9. Woven balls are generally considered by European players to provide better playing qualities than needlefelt balls. This is confirmed by the decreasing grades of overall performance given to the standard needlefelt ball throughout the experiment (see Chart X). The performance of the Prototype 1 and Prototype 2 balls were therefore surprising as the Prototype 1 ball was rated more highly than the woven ball throughout the experiment, and the Prototype 2 ball was considered as having the same overall quality as the woven ball after 240 minutes of play.
10. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardise the validity of the abovementioned Application or any Patent issued thereon.

Date:

15th February 2002

Signed:


ALAN JOHN BRASIER

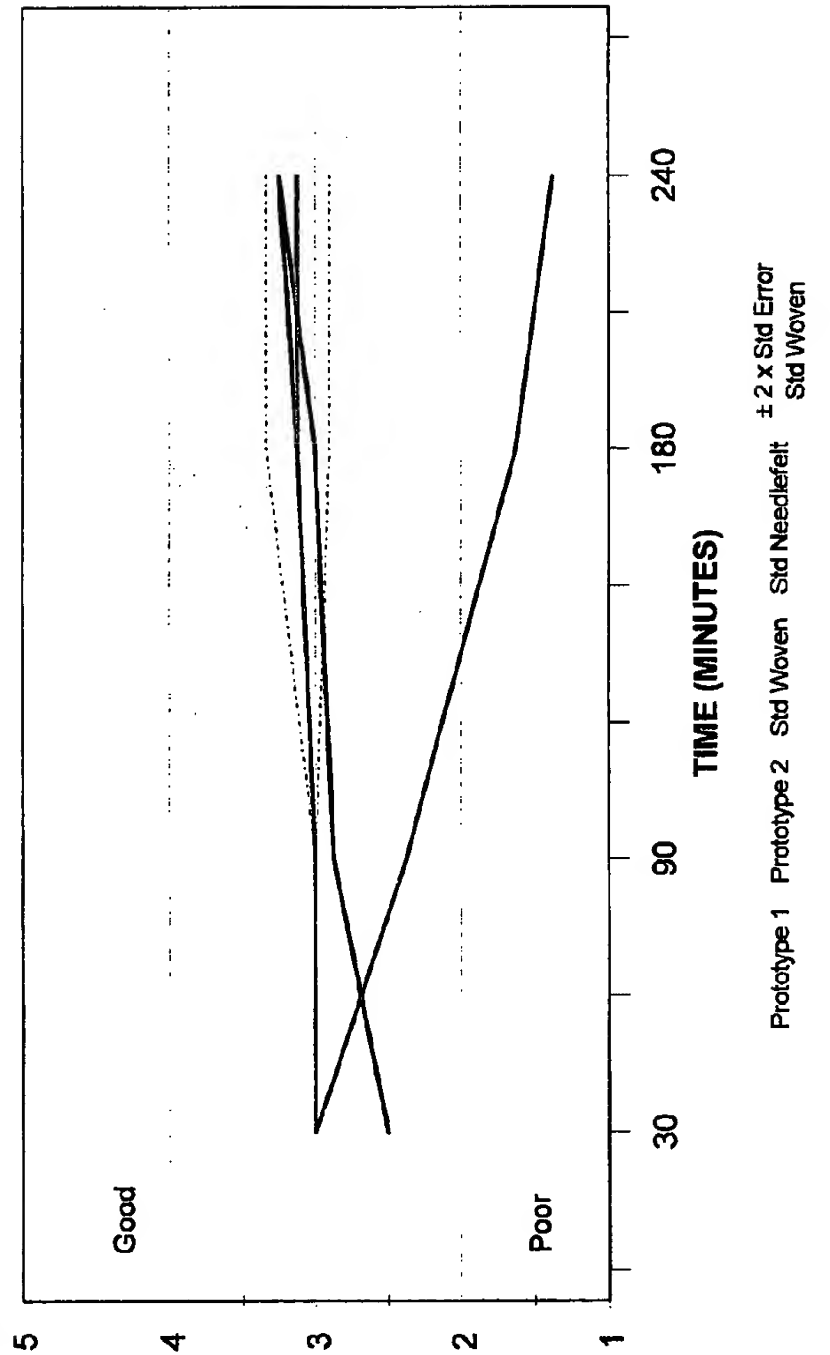
Tennis Fel. Court Play Evaluation

Non Woven Tennis Cloth Development

Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt

FELT COVER WEAR

PLAYER RATING

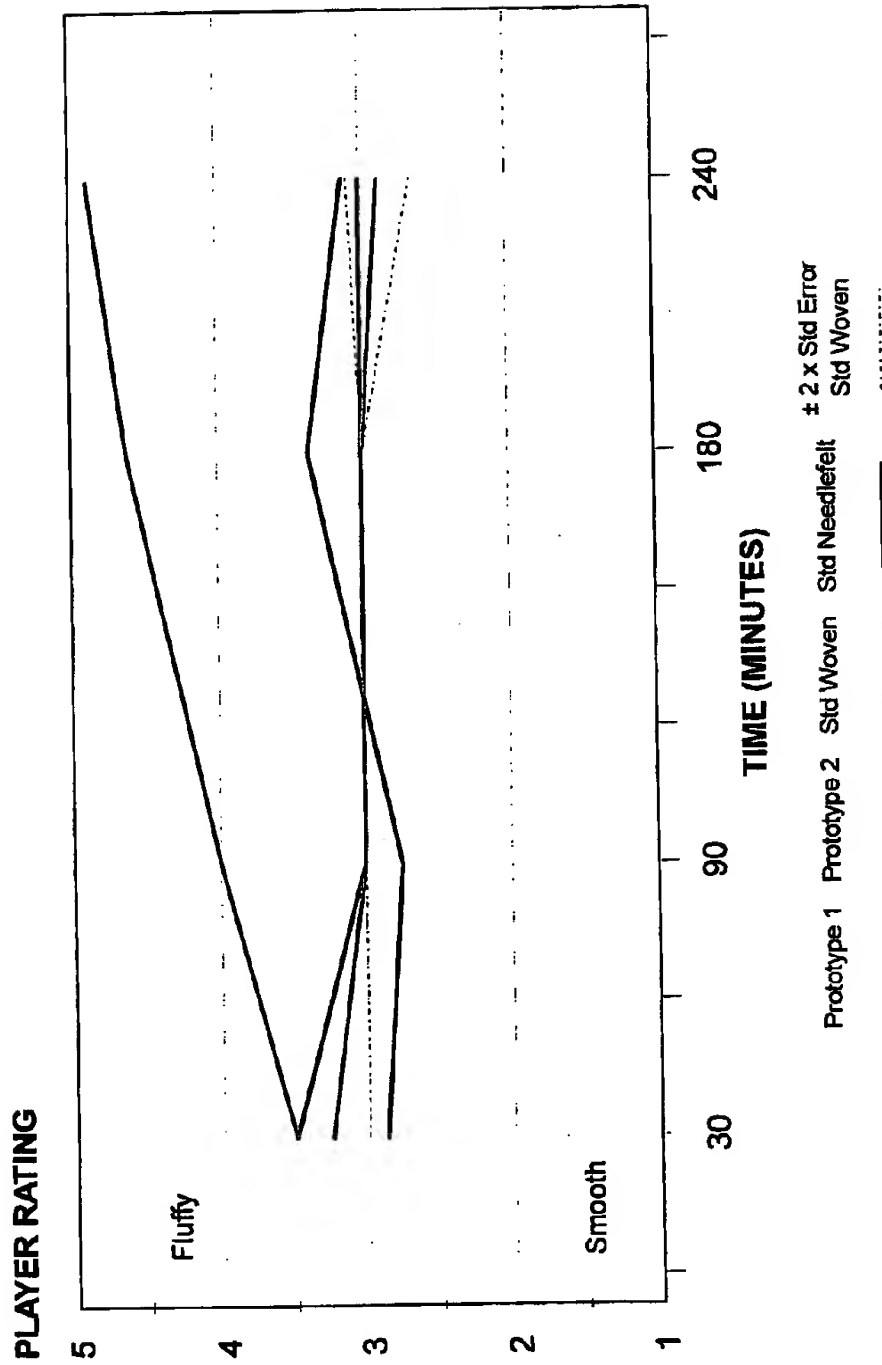


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Presented by : A.J. Brasier
Date : October 1997

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Tennis Felt Court Play Evaluation

Non Woven Tennis Cloth Development Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt FELT COVER FLUFF LEVEL

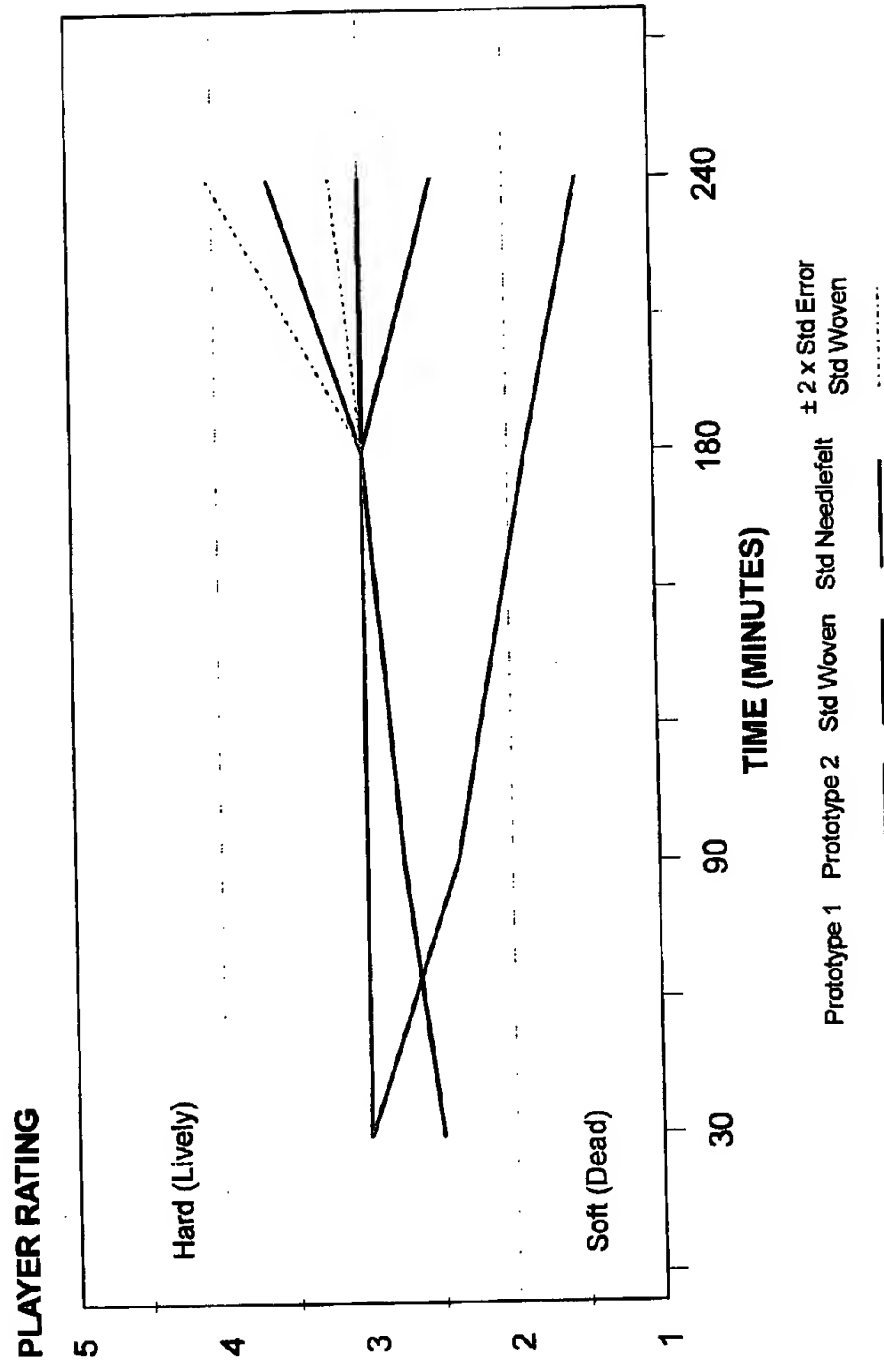


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Tennis Felt Court Play Evaluation

Non Woven Tennis Cloth Development Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt FEEL OFF RACQUET



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Date : October 1987

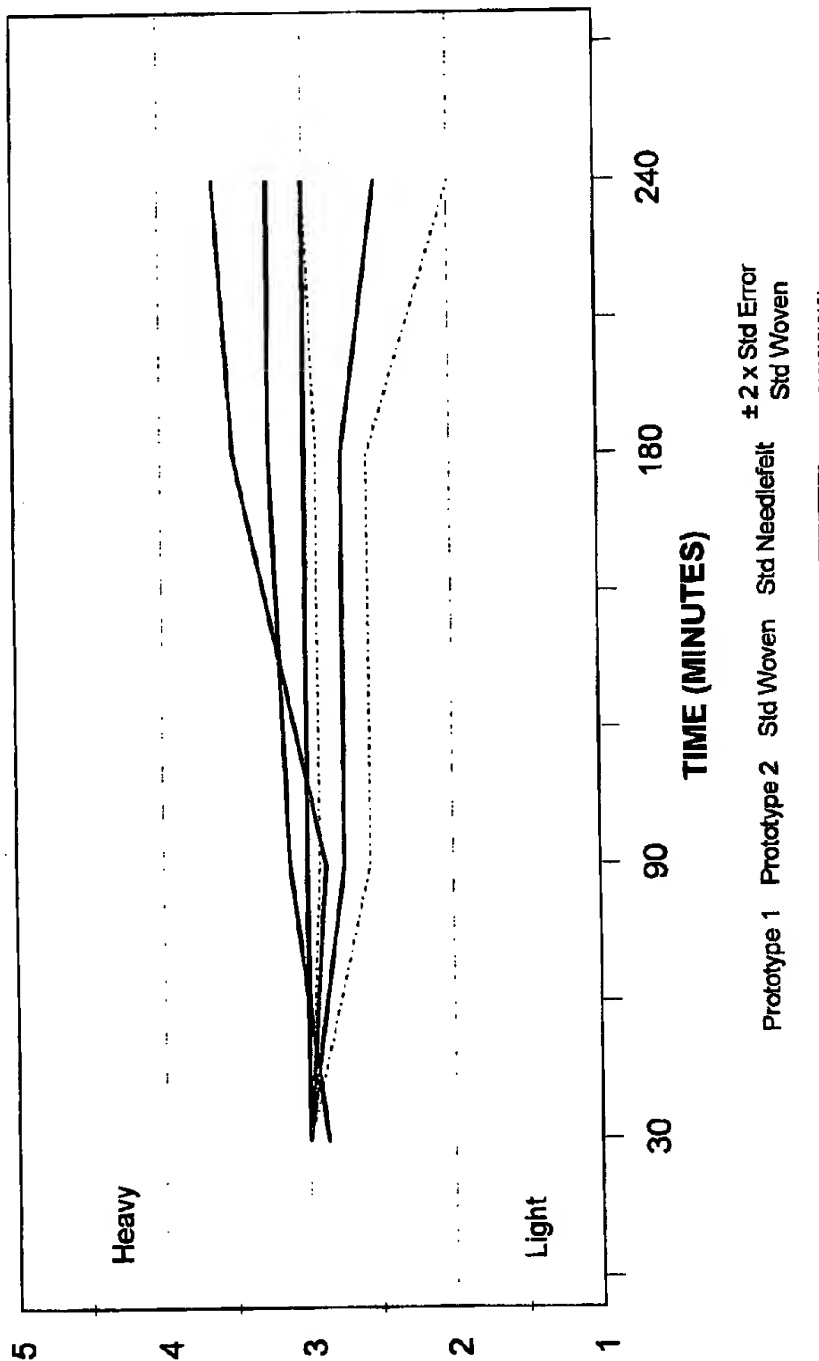
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Tennis Felt Court Play Evaluation

Non Woven Tennis Cloth Development

Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt WEIGHT OFF RACQUET

PLAYER RATING

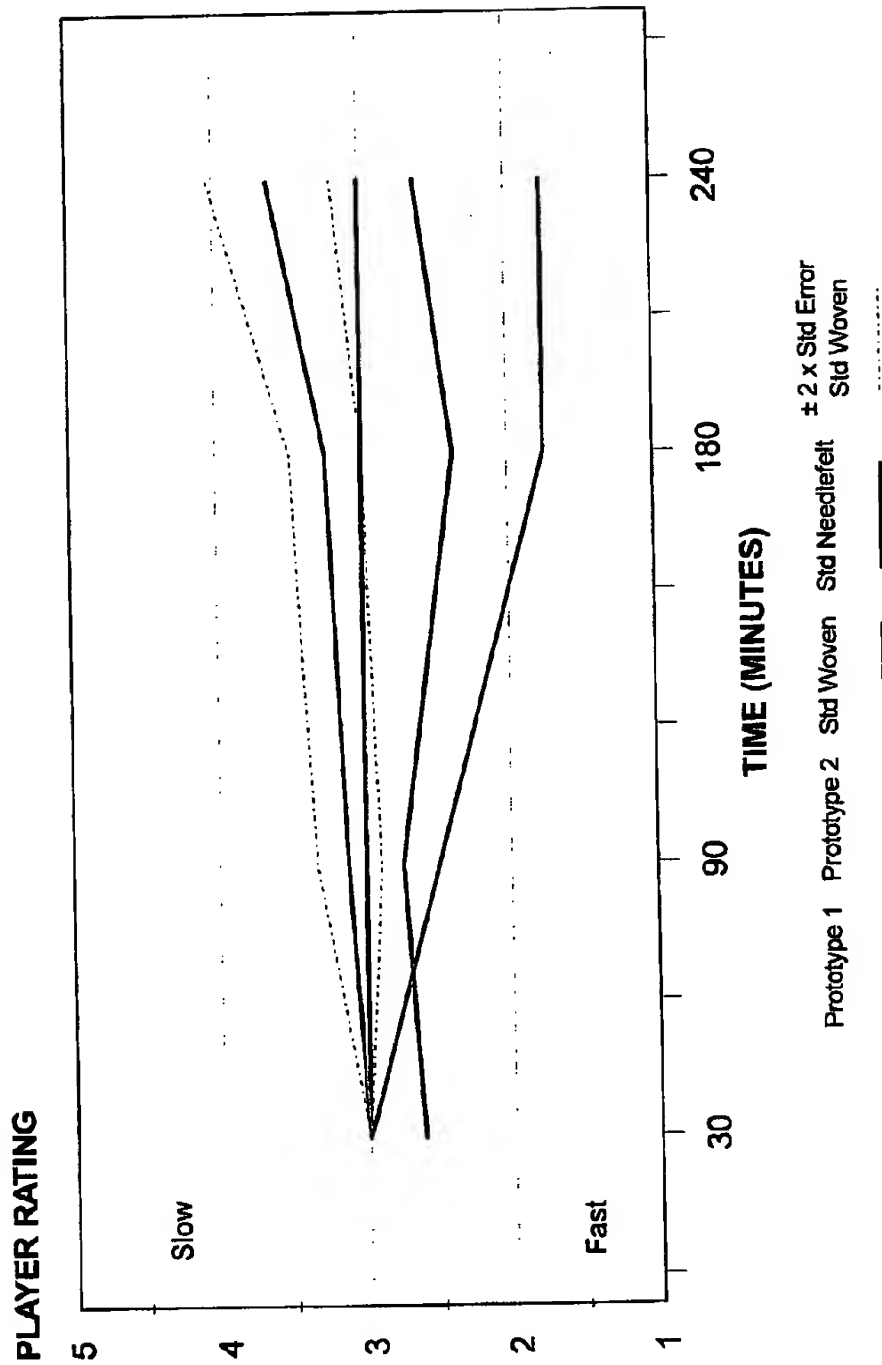


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Tennis Felt Court Play Evaluation

Non Woven Tennis Cloth Development Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt SPEED OF FLIGHT

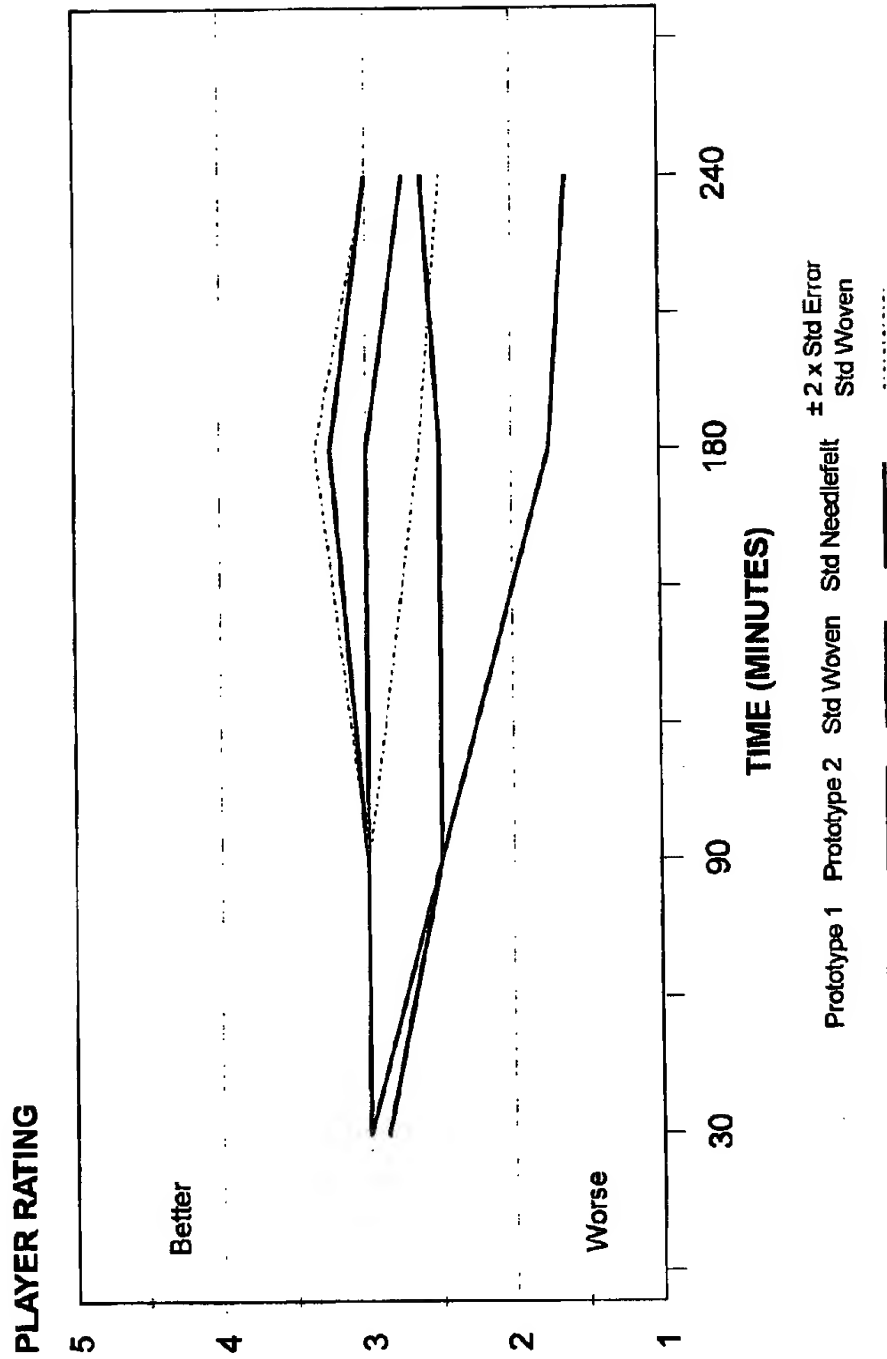


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Tennis Felt Court Play Evaluation

Non Woven Tennis Cloth Development Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt CONTROL OF SPIN



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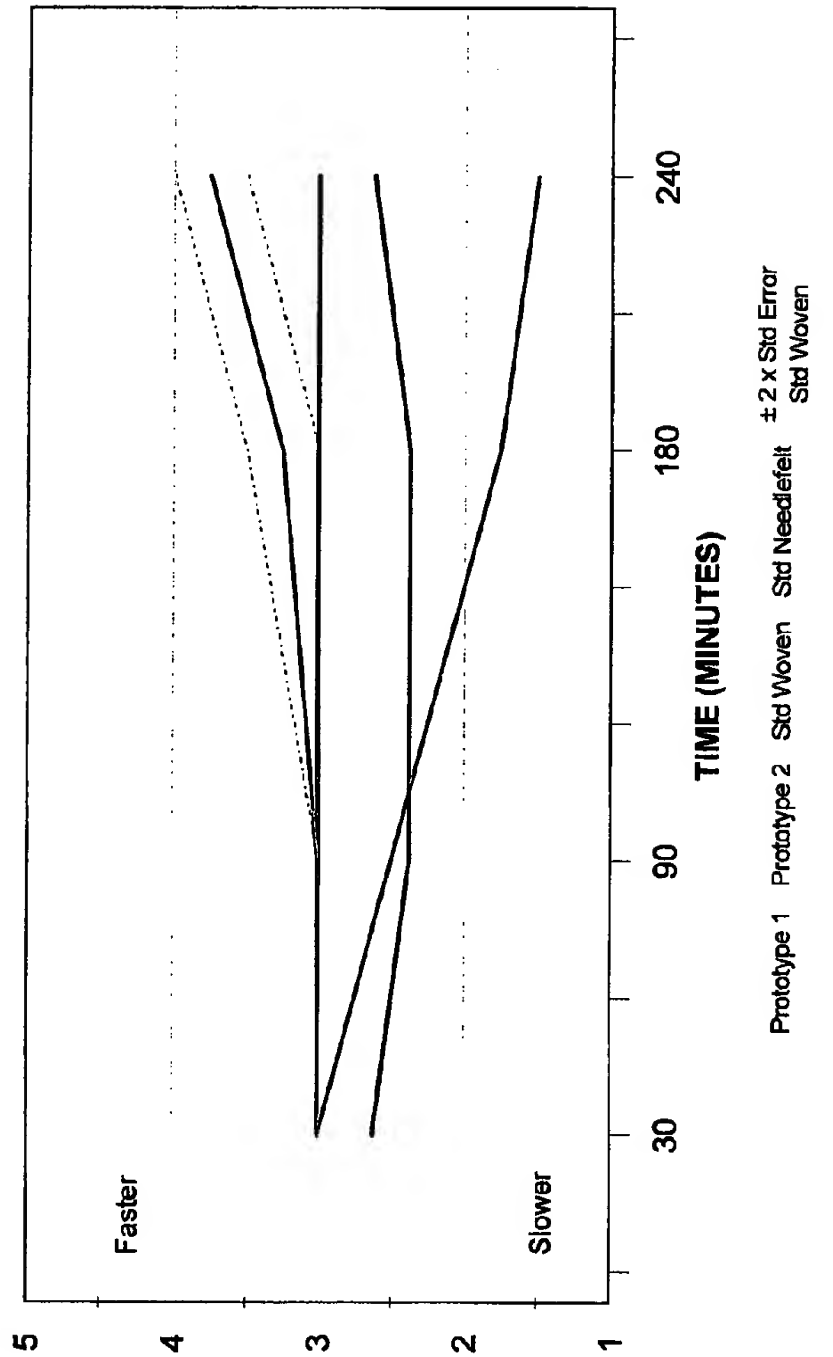
Tennis Felt Court Play Evaluation

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Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt

REBOUND SPEED

PLAYER RATING



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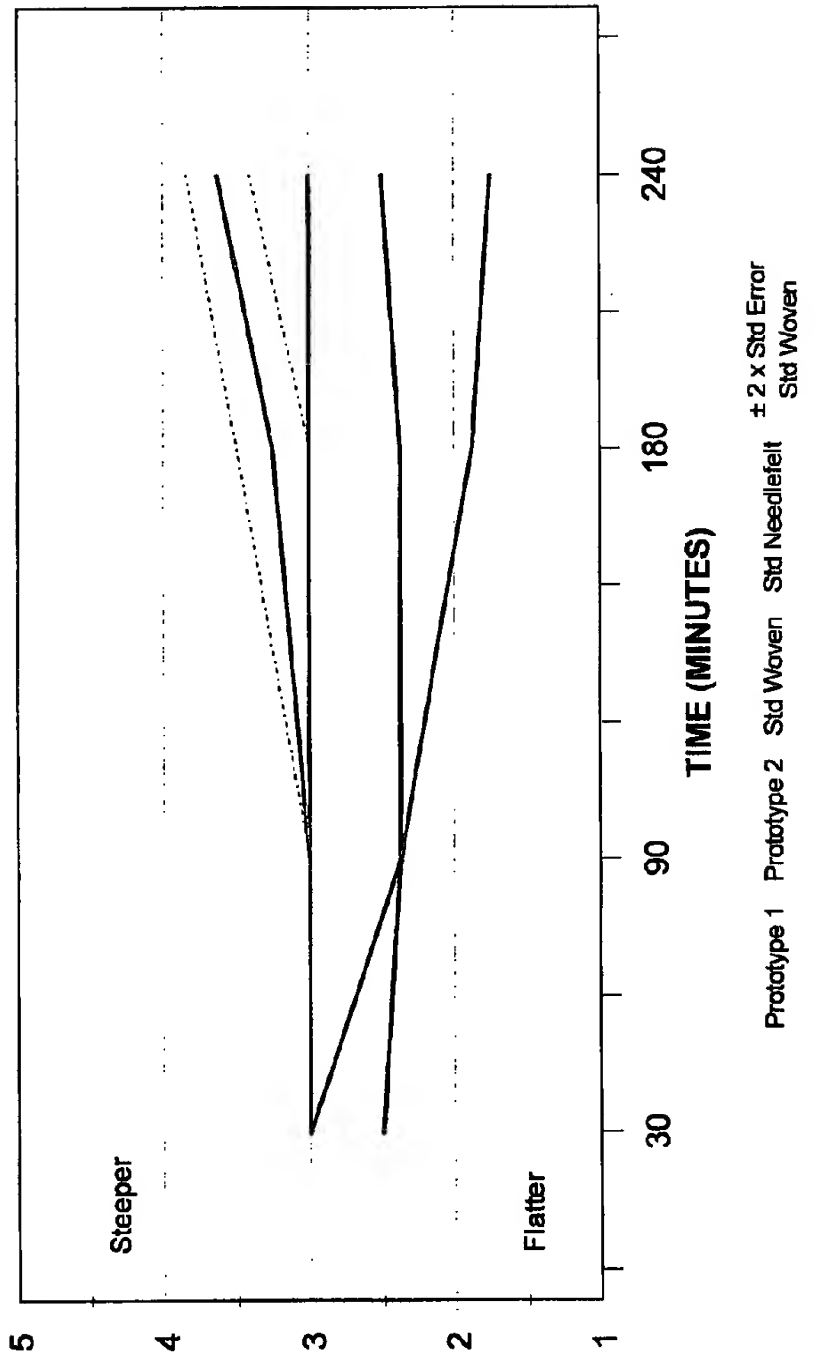
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REBOUND ANGLE

PLAYER RATING



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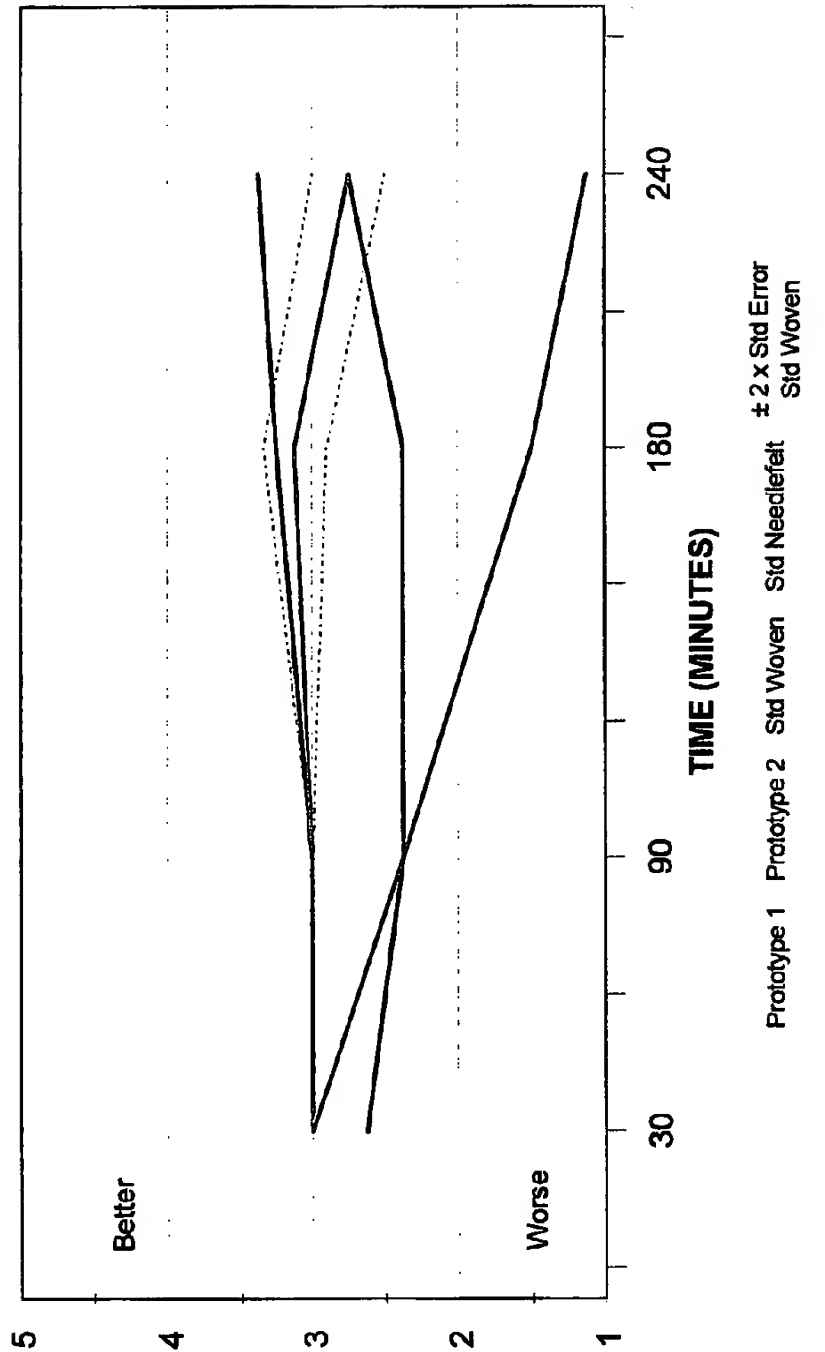
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Tennis Felt Court Play Evaluation

Non Woven Tennis Cloth Development

Comparison of Angled Needled Prototypes 1 & 2 with Standard Woven & Needlefelt OVERALL PERFORMANCE

PLAYER RATING



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